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the seed in January, and by the destruction of the seedlings by spraying with a 10 per cent kerosene emulsion.

The study of the morphology of the reproductive organs shows a single archesporial cell giving rise to a parietal cell, which BILLINGS says does not appear in *T. usneoides*. In four or five days after formation the megaspore mother cell begins the divisions that result in a linear tetrad; an embryo sac of the usual type is produced; double fertilization commonly occurs, and the endosperm develops as free nuclei which eventually line the sac and become separated by walls. The development of the embryo is of the usual *Alisma* or *Sagittaria* type characteristic of most monocotyledons. The dispersal of the seeds is facilitated by long barbed hairs arising from the integument, and later functioning in attaching the seeds to the substratum, upon which they speedily germinate. Under favorable conditions germination frequently occurs within the capsule before the dispersal of the seed.—GEO. D. FULLER.

Permeability.— Heretofore the power of various anilin dyes to stain living plant cells has been tested on algae, water plants, root hairs, or thin sections of organs of land plants, a method introduced by the pioneer work of PFEFFER. KÜSTER¹⁸ conceived that surface cells as used in this method may have different permeability characters from the deeper placed ones, also that cells of land plants may have their permeability characters considerably altered by sectioning. In order to test the ability of anilin dyes to penetrate the deeper lying cells in their natural conditions, KÜSTER used twigs of some size, or at least whole leaves with petioles. The cut ends were placed in aqueous solutions of the dyes, which were carried up the xylem by the transpiration stream, and, after 24 hours sections of the organs were studied for staining of the living cells along the xylem strands. A number of anilin dyes that former workers have pronounced incapable of entering living cells KÜSTER finds by this method to be excellent *intravital* stains. He distinguishes carefully between true *intravital* staining and staining due to injured protoplasm. In many cases cells were not injured by many days' treatment with dyes, and dyes abundantly stored in living cells were not reduced in amount by several days' washing in running water.

His results furnish much evidence against OVERTON's lipid theory of permeability; and in contrast to the results of RUHLAND on plant cells and HÖBER on animal cells, show, with few exceptions, a general parallelism between high diffusibility (non-colloidal) of the aqueous solution of anilin dyes and their ability to penetrate the living cell.—WILLIAM CROCKER.

Chemical unit-characters in maize.—While all inherited characters are probably referable to chemical relations brought about in the segregations and recombinations of the substance and substances of the germ cells, little atten-

¹⁸ KÜSTER, ERNST, Über die Aufnahme von Anilinfarben in lebende Pflanzenzellen. Jahrb. Wiss. Bot. 50: 261-288. 1911.